

## Why waste good nutrients?

*If they're beneficial and environmentally sound, they might make good fertilizer, says researcher*

FINDING NEW USES FOR FACTORY BY-PRODUCTS may reduce dependency on landfills while supporting farmers economically, if a new initiative pans out that partners industry with food producers to promote positive environmental change.

Kemptville College researcher Bill Curnoe and David Lapen from Agriculture and Agri-Food Canada have been working with factories around Eastern Ontario to determine if specific industrial by-products can be used as an organic matter or nutrient supplement for agricultural land. This could create a new use for organic waste destined for landfills, while potentially saving farmers from high input costs associated with manufactured fertilizers.

"If the factories' waste products can be added to fields with no detrimental effects while adding organic matter or nutrients, then everybody wins," says Curnoe.

Curnoe is researching the soil building properties and nutrient concentrations of various bio-solids from pulp and paper mills, the starch industry, milk industry and fibre manufacturers. He is documenting the speed at which products travel through soil pore systems to determine if applications are dangerous to the water or soil.

Curnoe aims to establish application rates required to replace commercial fertilizer, to verify if this would save farmers money down the road. The research will help decrease dependency on landfills by promoting an environmentally sustainable solution where waste becomes a viable marketable product.

"Environmental protocols recommend that products destined for agricultural application have an environmental certificate indicating significant background research," says Curnoe. "We require a certificate of approval from the

ministry of environment even to test products on farm land."

Curnoe says some by-products are likely more suitable for agricultural application than others, and by-products used in place of commercial

**"We need to determine if the products can be used in agricultural production." – Bill Curnoe**

fertilizer or manure must be compatible with agricultural production. To that end, his research is designed to reveal that by-products are free of toxins and metals that could be damaging to crops. Curnoe is attempting to find products that will increase crop growth and decrease environmental degradation, while addressing the

economical constraints of farmers and factories.

"Our aim is to find a mutual benefit for agricultural producers and factories," says Curnoe. "We need to determine if the products can be used in agricultural production."

The research is being conducted on farm sites. By monitoring soil and crop production properties such as pH levels, nitrate concentration, organic matter levels, and yield, researchers can regulate rates, timing and methods of application.

"While society might consider application of bio-solids distasteful, finding a solution to overflowing landfills is imperative," says Curnoe. "We need to produce viable solutions, and agricultural application might be one."

This research is supported by Domtar, E.B. Eddie, CASCO, Straconna, Invista, Parmalat and the Ontario Ministry of Agriculture, Food and Rural Affairs.



Bill Curnoe is using technology, such as this liquid manure spreader, to study the use of by-products as a nutrient supplement.

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# HEIFERS IN A HURRY



IT'S POSSIBLE TO RAISE HEIFERS MORE RAPIDLY simply by using corn silage as an energy base and adding protein supplements to the feed, without jeopardizing milk production, according to Kemptville College, University of Guelph researcher Paul Sharpe.

Entering the end of his three-year study

into rapid growth, he's found that animals fed to gain 900 grams a day have significantly greater hip height, hip width, heart girth and teat length than heifers fed to gain 700 grams per day.

Preliminary findings show there are no noticeable changes in cull percentages or milk yield

Paul Sharpe is researching ways to grow heifers faster without sacrificing milk production.

percentages, and suggest that heifers can be grown at a more rapid rate using high-energy diets, as long as protein ratios are appropriately set.

## Helping farmers comply with new nutrient management regulations

SOLID MANURE SPREADERS ARE KNOWN TO distribute organic matter unevenly. That creates difficulty when determining rates of application....and new nutrient management regulations require farmers to understand calibration techniques and application rates.

Researcher Ben Hawkins, Kemptville College, University of Guelph, has stepped up to the challenge of equipping farmers

with the knowledge and methods to properly handle their manure.

Using distributors' machinery, he's holding seminars to teach farmers how to properly calibrate their spreaders. The performance of solid, semi-solid, liquid manure and bio-solid spreaders are evaluated regarding their range of application rates, evenness of application, power requirements and soil bearing pressures. The advantages and disadvantages of each piece

of equipment are discussed, emphasizing calibration techniques.

Hawkins has also completed some on-farm testing. Spread widths, uniformity, manure consistency, nutrient analysis and power requirements were analyzed and documented to show producers how tractor speed, spreader volume, unloading time, spread width and manure density can affect the rate of application.

# Preserving nutritious harvests in underdeveloped communities

*Researchers study alternatives to promote more efficient homegrown fruit and vegetable production*

WITHOUT REFRIGERATORS OR APPROPRIATE STORAGE, consumers in developing countries are left dependent on imported perishables. Research based out of Kemptville College, University of Guelph, is helping farmers in underdeveloped countries find ways to ease this situation, using one of their greatest natural resources: the sun.

Dr. Don Mercer is committed to increasing the quality of life for rural families in Honduras, Sub-Saharan Africa and Equatorial Guinea by developing practical solar food dryers. Solar dryers use the sun to preserve perishable foods, through dehydration.

Farmers in these countries are blessed with two growing seasons, and short harvests quickly produce an abundance of fruits and vegetables. But the harvests are concentrated in a two- to three-week period. And with electricity and firewood scarce, the hot, dry climates typical of these countries cause produce to spoil quickly. That means families have to buy more expensive imported foods.

“Rural farmers in these areas have little money to show for their hard work and long hours,” says Mercer. “It’s a shame they end up spending money on veggies and fruit similar to that which they already produce.”

Through his research in various countries, Mercer has been able to build solar dryers that require no energy inputs, and work efficiently in their specific climates.

Here’s how they work. Food is placed in a chamber, on drying racks where heat from the sun can be concentrated. Moisture removed from the perishables escapes through a vent, leaving dehydrated fruits and vegetables that can be easily stored for future use.

Mercer’s investigated various chambers, holding racks and heat collectors to determine what’s required to create an optimal drying unit, and over the years he’s created various prototypes capable of small-scale processing. These have been tested, and processing manuals have been created for various locations such as Equatorial Guinea and Catacamas, Honduras.

Mercer says his research will help underprivileged rural farmers save money and preserve their food supply. But, he adds, consumer education is vital for this new technology.

“Dried fruits and vegetables are not universally interchangeable with fresh produce,” he says. “We need to promote the use of dehydrated foods in cooking to show rural families how dryers can be beneficial.”

Mercer’s research is supported by the Canadian International Development Agency.

Don Mercer is researching solar food dryers, like the one shown here, to help underdeveloped communities preserve food all year round.



Liz Forbes prepares food samples for a national diet study.

## She samples Canada’s vast grocery selections

EVERY YEAR, FOR ABOUT FIVE WEEKS, RESEARCHER Liz Forbes at Kemptville College, University of Guelph, and her colleagues are kept busy preparing samples for the Canadian Total Diet Study conducted each year by Health Canada — a study that aims to estimate the dietary consumption of toxic chemicals by average Canadians. Forbes is responsible for processing a wide variety of foods from several different stores within a targeted city.

The items are chosen from selected stores within a city targeted by Health Canada. Toronto was this year’s choice. Others in the recent past have included Winnipeg, St. Johns and Montreal.

Over the five-week continuous period, a variety of dry, frozen and perishable products are received. Researchers prepare portions typical of consumption, and then combine these portions into what’s called homogenized composites — where portions are mixed or blended into a single consistency. These composites are then shipped to Health Canada where they are tested for various toxic and nutritionally important chemicals.

“We prepare the products the way an average Canadian would,” says Forbes. Later, she and her team report these preparations.

Health Canada uses the research project to monitor the Canadian food supply, checking for pesticides, veterinarian drugs and heavy metal residues. This information is then disclosed to regulation bodies that monitor the national food supply.

This research is supported by Health Canada.

# New director emphasizes Kemptville's strategies in research and partnerships

IT'S A NEW ERA AT KEMPTVILLE COLLEGE, UNIVERSITY of Guelph. After nine years of dedicated service, seeing the college successfully through the transition to the becoming part of the university (it was previously under the auspices of the Ontario Ministry of Agriculture, Food and Rural Affairs), director Bill Curnoe is turning the reins over to renowned environmental researcher Michael Goss. Curnoe is retiring, but will maintain his research program in alternative fertilizers.

Goss's agenda is to develop strategic partnerships and further develop the college's research agenda. He wants to nurture research-intensive partnerships between Kemptville College, College d'Alfred, other Canadian universities and various federal government departments.

"Kemptville College is ideally located, close to Ottawa and in the centre of Eastern Ontario agricultural region," says Goss. "With additional research stations in New Liskeard and Emo, the college is also able to support Timiskaming and Rainy River agricultural districts."

Kemptville College is endowed with faculty dedicated to creating and maintaining research opportunities through partnerships with regional agricultural industries. The close proximity to Ottawa also provides opportunities to investigate the urban-rural interface and create partnerships with the federal government.

With research stations situated in both



**Mike Goss is the newly appointed director of Kemptville College.**

Eastern and Northern Ontario, Kemptville College has the resources to meet the needs of the agriculture and food industries. Kemptville also has the unique opportunity to address agricultural production systems and their relationship to climate change.

"With the help of faculty at Kemptville, I hope to establish strong research programs in equine management, food safety and sustainable animal production systems," says Goss. "The faculty have considerable expertise and are enthusiastic about moving the research agenda forward."

## Research stations help farmers choose the best seed

WHEN CHOOSING SEED VARIETIES THAT WILL PERFORM well, farmers need up to date information that is pertinent to their area, climate and soil conditions. Kemptville's research trials located in Winchester, Lancaster and Pakenham mirror typical conditions throughout Eastern Ontario.

Researcher Bill Curnoe works with private and public suppliers to run performance test plots on numerous varieties of corn and cereal crops,

forages and oil seeds each year. He conducts performance comparisons between private and publicly bred crops that are suggested for Eastern Ontario's heat unit recommendations. Crops are monitored throughout the growing season for growth performance, productivity, weather resistance, drought or high precipitation resistance, stalk strength and other quality indicators.

Harvest time reveals yield averages and overall productivity. A balance and check system is created to test the performance of new varieties and how they can be compared to known varieties already heavily used by farmers in the area.

Curnoe suggests that farmers use the information as a tool over a period of time, warning against drastic changes based on a single year's results.

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